FURTHER NOTES ON THE HYMENOPTEROUS FAUNA OF THE YAEYAMA GROUP

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THREE TEXTFIGURES

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Although the hymenopterous fauna of the Yaeyama Group, Ryûkyû Archipelago, is fairly well known, the knowledge is almost confined to that of Ishigaki Island of the Group, and, so far as the wasps and bees are concerned, it seems rather difficult to add more species to the fauna of that island. On the contrary, however, the hymenopterous fauna of such islands as Yonakuni, Iriomote and Haderuma is almost entirely unknown to science. So far as I am aware, the only records from these islands are: *Odynerus flavolineatus* Smith and *Ophion luteus* Linné from Yonakuni Island, and *Vespa ducalis* Smith var. *pulchra* Buysson and *Sphex umbrosus* Christ from Iriomote Island.

In 1934, Prof. Teiso Esaki made an expedition to the Yaeyama Group and collected some wasps, bees and ants on the above mentioned islands. This collection contains several interesting species which may be worthy of mention. In the present paper I give a list of Hymenoptera collected by Prof. Esaki and some discussions on several species.

Before going further I express my hearty thanks to Prof. T. Esaki of the Kyushu Imperial University for his kind guidance and also to Messrs. Masabumi Tamano of Amami-Oshima Island and Chosen Senaha of Ishigaki Island for their assistance in providing me some specimens which were also used in the present paper.

I. LIST OF HYMENOPTERA COLLECTED BY PROF. ESAKI ON ISHIGAKI ISLAND

Ichneumonidæ

1. *Xanthopimpla detruncata* Krieger, 1914

   1♂, 24. vi, Bannadake.

   This is new to the fauna of Ishigaki Island.

Annot. Zool. Japon., Vol. 15, No. 1. 1935

Formicidæ

2. *Polyrhachis dives* Smith, 1857
2☿☿, 24. vi, Bannadake.

Scoliidæ

3. *Campsomeris testaceipes* (Cameron), 1904
1♂, 24. vi, Bannadake.
4. *Scolia* (*Scolia*) *4-pustulata* Fabricius, 1781
1♀, 1. vii, Bannadake, 1♂, 25. vii, Kabira-Fukai.
5. *Scolia* (*Carinoscolia*) *melanosoma* (Saussure), 1859
1♀, 1. vii, Bannadake.

Eumenidæ

6. *Rhynchium fukaii* Cameron, 1911
1♀, 12. vii, Shika-Miyara, 1♀, 24. vii, Shika-Kabira.
This is the first definite record of this species from Ishigaki Island.
7. *Odynerus* sp.
1♂, 1. vii, Bannadake.
8. *Eumenes esuriens* (Fabricius), 1787
1♂, 24. vi, Bannadake, 1♀, 12. vii, Shika-Miyara.

Psammocharidæ

9. *Cyphononyx iridipennis* (Smith), 1858
1♀, 29. vi, Shika.
10. *Cyphononyx flavus* (Fabricius), 1775
2♀♀, 24. vi, Bannadake, 1♀, 29. vi, Shika, 1♂, 24. vii, Shika-Kabira.
11. *Psammochares* (*Anoplius*) *subsericeus* (Saussure), 1867
1♀1♂, 24. vi, Bannadake.
This species is new to the fauna of Ishigaki Island.
12. *Episyron* sp.
1♂, 1. vii, Bannadake.

Ampulicidæ

13. *Ampulex dentata* Matsumura et Uchida, 1926
2♀♀, 24. vi, Bannadake.
This species was described from Okinawa Island and is new to the fauna of this island.

Sphecidæ

14. *Sceliphron inflexum* Sickmann, 1894
1♀, 12. vii, Shika-Miyara.

15. *Sceliphron madraspatanum* (Fabricius), 1781
1♀, 24. vi, 1♀, 1. vii, Bannadake.

Megachilidæ

16. *Megachile bicolor* (Fabricius), 1787
2♀♀, 4. vii, Shika, 1♀, 25. vii, Kabira-Fukai.
This species is new to the fauna of Ishigaki Island. According to Prof. Esaki and Mr. Senaha, this species is very common on the island.

Xylocopidæ

17. *Xylocopa albinotum* Matsumura, 1926
1♀, 1. vii, Bannadake.

Anthophoridæ

18. *Anthophora florea* Smith subsp. *urens* (Cockerell), 1911
3♀♀, 24. vi, Bannadake.

II. LIST OF HYMENOPTERA COLLECTED BY PROF. ESAKI ON IRIOMOTE ISLAND

All the species recorded here are new to the fauna of Iriomote Island.

Scoliidæ

1. *Campsomeris testaceipes* (Cameron), 1904
1♂, 16. vii, Sonai-Sonaidake.

Eumenidæ

2. *Ancistrocerus ishigakiensis* Yasumatsu, 1933
1♂, 17. vii, Sonai-Urauchi.
3. *Rhynchium fukaii* Cameron, 1911
1♀, 21. vii, Sonai-Hoshitate, 1♀, 22. vii, Sonai-Shirahama.
4. *Rhynchium umenoi* Yasumatsu, 1933
1♀, 16. vii, Sonai-Sonaidake.
5. *Eumenes esuriens* (Fabricius), 1787
1♀, 21. vii, Sonai-Hoshitate.

Psammocharidæ

6. *Batozonus unifasciatus* (Smith), 1855 (auct.)
1♀, 17. vii, Sonai-Urauchi.

Sphecidæ

7. *Sphex nigellus* Smith, 1856
1♀, 16. vii, Sonai-Sonaidake.

8. *Sceliphron madraspatanum* (Fabricius), 1781
   1♀, 17. vii, Sonai-Urauchi.

Anthophoridæ

9. *Anthophora cingulata* (Fabricius) subsp. *senahai* Yasumatsu, subsp. nov.
   1♀, 21. vii, Sonai-Hoshitate.

III. LIST OF HYMENOPTERA COLLECTED BY PROF. ESAKI ON YONAKUNI ISLAND

All the species recorded here are new to the fauna of Yonakuni Island.

Formicidæ

1. *Polyrhachis dives* Smith, 1857
   1☿, 5. vii, Sonai-Kubura-Hinai.

Eumenidæ

2. *Ancistrocerus ishigakiensis* Yasumatsu, 1933
   1♀, 5. vii, Sonai-Kubura-Hinai.
3. *Ropalidia variegata* (Smith), 1852
   2☿☿, 2♂♂, 5. vii, Sonai-Kubura-Hinai.
4. *Vespa formosana* Sonan, 1927
   1♀, 6. vii, Sonai-Kubura-Hinai.

Sphecidæ

5. *Sphex viduatus* Christ, 1791
   = *Sphex platynotus* Matsumura, 1912 (syn. nov.)
   1♀, 6. vii, Sonai-Kubura-Hinai.

Xylocopidæ

6. *Xylocopa albinotum* Matsumura, 1926
   1♀, 5. vii, Sonai-Urabudake-Hinai, 1♂, 6. vii, Sonai-Kubura-Hinai.

Anthophoridæ

7. *Anthophora cingulata* (Fabricius) subsp. *senahai* Yasumatsu, subsp. nov.
   1♀, 5. vii, Sonai-Urabudake-Hinai.

IV. LIST OF HYMENOPTERA COLLECTED BY PROF. ESAKI ON HADERUMA ISLAND

Up to the present not a single species of Hymenoptera has ever been recorded from Haderuma Island.

Eumenidæ

1. *Odynerus* sp.
   1♀, 27. vi, Huka-Naishi.

Vespidæ

2. *Polistes yayeyamensis* Matsumura, 1911
   1♀, 27. vi, Huka-Naishi.

Sphecidæ

3. *Sceliphron inflexum* Sickmann, 1894
   1♀, 27. vi, Huka-Naishi.

V. NOTES ON SOME SPECIES OF HYMENOPTERA FROM THE YAEYAMA GROUP

Psammocharidæ

1. *Psammochares* (*Anoplius*) *subsericeus* (Saussure)
   Pompilus subsericeus Saussure, Novara Reise, Hym., p. 60, ♀, 1867.
   Pompilus pruinosus Smith, New Sp. Hym. Brit. Mus., p. 147, ♀ (nec Smith, Cat. Hym. Brit. Mus., vol. 3, p. 141, ♀) 1879.
   Pompilus subsericeus Dalla Torre, Cat. Hym., vol. 8, p. 325, 1895.
   Pompilus subsericeus Bingham, Fauna Brit. India, Hym., vol. 1, p. 154, 1897.

♂. Extremely similar to the female except for the following differences. Pol : Ool = 1 : 1 (in the female, postocellar line slightly shorter than ocello-ocular line). Abdomen more slender, of the abdominal sternites the third and fourth especially with erect, long hairs as shown in Figure 1. Fore wings slightly darker uniformly, with the outer margin more narrowly infuscated.

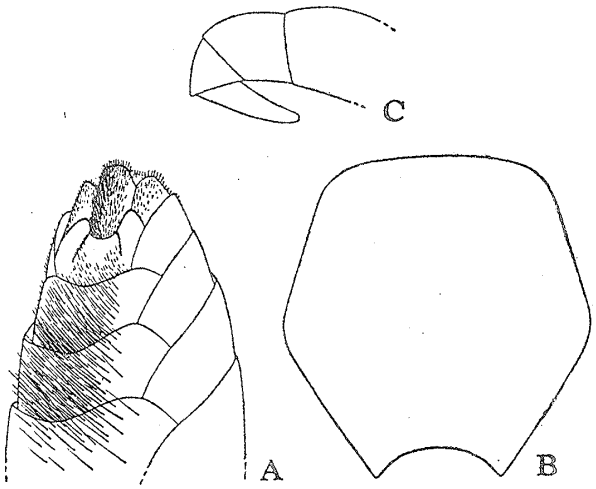

Fig. 1. A. Apical segments of abdomen of *Psammochares* (*Anoplius*) *subsericeus* (Saussure), ♂, in latero-ventral aspect. B. Clypeus of *Ancistrocerus ishigakiensis* Yasumatsu, ♂. C. Apical segments of antenna of the same.

Length of head and thorax put together: 5.6 mm., first and second abdominal tergites put together: 3.8 mm., fore wing: 10.5 mm., hind wing: 8.0 mm.

Width of head: 2.9 mm., thorax: 2.1 mm., first abdominal tergite at apex: 1.6 mm., second tergite at apex: 2.0 mm.

Relative length of the segments of antenna: I: II: III: IV: V = 17: 5: 13: 12: 12.

Allotype—1 ♂, 24. vi. 1934, Bannadake, Ishigaki Island, collected by Prof. Esaki.

Eumenidæ

2. *Ancistrocerus ishigakiensis* Yasumatsu

Ancistrocerus ishigakiensis Yasumatsu, Annot. Zool. Japonenses, vol. 14, no. 2, p. 260, ♀, pl. 14, figs. 1 et 2, 1933.

♂. Similar to the female except for the following differences. Orange-yellow markings on temple narrower, the same coloured marking just above the insertions of antennæ reduced to a small spot. Third antennal segment almost ferruginous except the upper surface. Mesonotum without orange-yellow markings. Orange-yellow band on the first abdominal tergite slightly produced anteriorly at the sides.

Eyes much closer to each other at clypeus than on vertex. Clypeus as shown in Figure 1 and the anterior free portion as long as the upper interocular part. Antenna much elongate, most of the segments of flagellum longer than wide; thirteenth segment as long as eleventh and very slender, folded beneath and reaching the apex of tenth segment, its extreme apex not pointed.

Length of head and thorax put together: 5.5 mm., first and second abdominal tergites put together: 4.6 mm., fore wing: 9.2 mm., hind wing: 6.5 mm.

Width of head: 3.0 mm., thorax: 3.0 mm., first abdominal tergite at apex: 2.6 mm., second tergite at middle: 2.9 mm.

Relative length of the segments of antenna: I: II: III: IV: V = 21: 3: 12: 8: 8.

Allotype—1 ♂, 17. vii. 1934, Sonai-Urauchi, Iriomote Island, collected by Prof. Esaki.

Anthophoridæ

3. *Anthophora florea urens* (Cockerell)

Anthophora urens Cockerell, Entomologist, vol. 44, no. 582, p. 341, 1911.

Anthophora brookiae Matsumura (nec Bingham), Thous. Ins. Japan, Suppl., vol. 4, p. 200, pl. 54, fig. 10, 1912.

Anthophora urens Cockerell, Ann. Mag. Nat. Hist., ser. 9, vol. 15, no. 88, p. 490, 1925.

Anthophora brookiae Matsumura et Uchida, Ins. Mats., Sapporo, vol. 1, no. 2, p. 66, 1926.

Anthophora urens Cockerell, Pan-Pacific Entom., vol. 3, no. 2, p. 87, 1926.

Anthophora brookiae Yashiro, List of Ins. in Roo-choo Islands, Okinawa, p. 25, 1927.

Anthophora brookiae Matsumura, Illustr. Thous. Ins. Japan, Rev. ed., vol. 2, p. 171, pl. 17, fig. 10, 1930.

Anthophora urens Chujô, Sylvia, Taihoku, vol. 2, no. 2, p. 51, 1930.

Anthophora urens Cockerell, Ann. Mag. Nat. Hist., ser. 10, vol. 7, no. 37, p. 39, 1931.

Anthophora urens Yasumatsu, Annot. Zool. Japonenses, vol. 14, no. 2, p. 268, 1933.

Anthophora brookiae Kato, Three Colour Illustr. Ins. Japan, fasc. 10, pl. 31, fig. 1, 1934.

In his original description of *Anthophora urens*, Prof. T. D. A. Cockerell gave the following note (1911).

"A very distinct species, which may be compared with the following: *A. florea*, Sm., which differs by the ferruginous femora, and the narrow white hair-bands on abdomen; *A. proserpina*, Grib.,* which is more elongate, with orange face-markings; *A. insularis*, Sm., which differs at once in the coloration of the abdomen; *A. brookiae*, Bingh., which has testaceous nervures, the clypeus with more yellow, and lighter wings."

Prof. Cockerell further published the following key to separate some allied species of the genus from one another (1925).

"Hair of thorax above bright red, not mixed with black (Penang) ... ... *himalayensis*, Rad.

Hair of thorax above mixed with black 1

1. Second and third abdominal tergites covered with red hair (Singapore) ... ... *insularis*, Smith

Second and third abdominal tergites covered with broad or narrow bands... 2

2. Band on second segment reduced to a line except at sides; hind basitarsi with black hair (Formosa) ... ... *urens*, Ckll.

Band on segment not reduced to a line, or, if quite slender, hair of hind basitarsi not black... 3

* *A. proserpina* Gribodo, 1893 = *A. himalayensis* Radoszkowski, 1882 (after Meade-Waldo, 1914).

3. Hind basitarsi with black hair; all abdominal hair-bands of same colour (Bangalore) ... ... *subinsularis*, (Strand)
Hind basitarsi with red hair; last abdominal band paler than the others ... ... *subrussata*, Ckll."

So far as my investigation goes, *Anthophora florea* Smith, 1873, *A. urens* Cockerell, 1911 and *A. brookiae* of many Japanese authors (but not of Bingham) appear to be merely colour variations within a single species. I compared not only the hair bands on the abdominal segments but also the male genital appendages in several specimens representing these forms and originated from Japan, Yaeyama Group and Formosa, and reached the following conclusion. The characters given in the criteria according to Prof. Cockerell are not sufficient to regard *urens* as a distinct species, but the species may be ranked under *florea* as its subspecies. There is no difference in the structure of the male genital appendages between both of them. The hind basitarsi in the female specimens of *urens* from the Yaeyama Group are richly covered with red hairs except the apex. Some specimens from the same locality have the first and second abdominal tergites covered with short, red hairs. A female from Formosa has the hind basitarsi slightly covered with red hairs at the base.

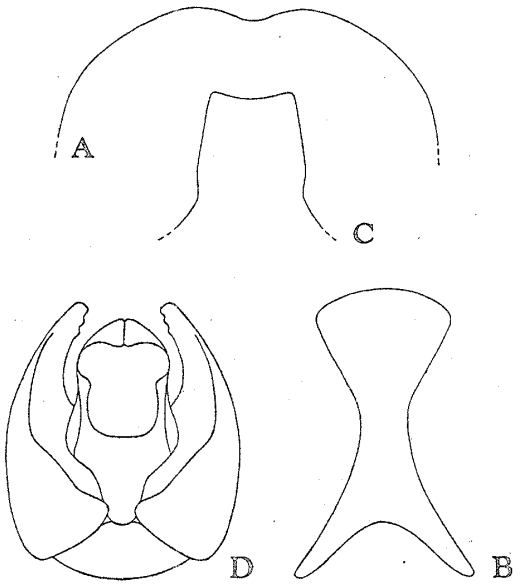

Fig. 2. *Anthophora florea urens* (Cockerell), ♂. A. Apical margin of the sixth ventral plate of abdomen. B. The seventh ventral plate of the same. C. The eighth ventral plate of the same except the base. D. Male genital appendages in dorsal aspect.

In the Japanese Empire, *Anthophora florea* Smith* is so far distributed as south as on Yakushima Island and its subspecies *urens* (Cockerell) occurs in the Yaeyama Group as well as throughout Formosa. Owing to the lack of specimens, the problem, which form of them may occur on Amami-Oshima and Okinawa Islands, should be left for a future investigation.

* In 1914, Meade-Waldo regarded that *Anthophora florea* Smith is no doubt the female of *A. villosula* Smith. But these two species are distinctly separable from each other. Mr. N. Tomari recorded *A. florea* from South Manchuria in 1930, but this record may not be accepted at present, as I have yet no opportunity to examine any specimen of this species from that locality.

Specimens examined are as follows.

Anthophora florea Smith—1 ♀ (30. vii. 1930, Kechi-Izuhara, Tsushima, Messrs. Hori et Cho), 1 ♂ (26. vii. 1930, Uchiyama-Tsutsu, Tsushima, Hori et Cho), 1 ♀ (30. viii. 1915, Ikeda, near Osaka, Honshu, Prof. Esaki), 2 ♀♀ (22. viii. 1930, Shimonoseki, Nagato, Honshu, Yasumatsu), 1 ♀ (14. vii. 1929, Inunaki-toge, Chikuzen, Kyushu, Esaki and others), 1 ♀ (22. viii. 1930, Hikosan, Buzen, Kyushu, Esaki), 1 ♀ (6. ix. 1930, Homansan, Chikuzen, Kyushu, Yasumatsu, 1 ♀ (7. ix. 1930, Fukuoka, Chikuzen, Kyushu, Yasumatsu), 1 ♂ (17. viii. 1930, Sefuriyama, Chikuzen, Kyushu, Yasumatsu), 1 ♂ (13. ix. 1930, Amakusa, Higo, Kyushu, Hori), 1 ♀ (10. ix. 1933, Sobosan, Bungo, Kyushu, Yasumatsu), 1 ♀ 1 ♂ (24. ix. 1934, Mizunashi, Chikuzen, Kyushu, Yasumatsu), 1 ♀ (23. vii. 1930, Yakushima, Mr. A. Umeno).

Anthophora florea urens (Cockerell)—1 ♀ (4. vii. 1932, Taihoku, Formosa, Prof. Esaki), 1 ♂ (9. viii. 1932, Chipongoe, Taito-cho, Formosa, Esaki), 2 ♀♀ 1 ♂ (24. vi. 1934, Bannadake, Ishigaki Island, Esaki), 2 ♀ ♀ (1. vii. 1933, Ishigaki Island, Mr. Senaha).

4. *Anthophora cingulata senahai* Yasumatsu, subsp. nov.

♂. Head and thorax above with very bright ferruginous hairs, slightly mixed with fuscous ones. Hairs on labrum white anteriorly and black basally, and those on clypeus entirely black. First abdominal tergite with light ferruginous hairs sparse (denser at the base and sides). Abdomen with five shining emerald-green bands. Tibia and basitarsus of mid-legs with creamy white hairs on outer side, except for the anterior margin of the latter, where the hairs are black. Tibia of hind legs with creamy white hairs on outer side and with an almost white tuft posteriorly at apex. Basitarsus of hind legs entirely covered with black hairs.

Black, legs black or ferruginous black. Tegulæ dull ferruginous. Wings slightly brownish, nervures black or brownish black. Face with the following portions cream colour: a transverse supraclypeal triangular marking, an inverse T-shaped large marking on clypeus, triangular portions between each eye and clypeus, labrum except the latero-basal spots and margin, and most of the basal half of mandibles. Scape of antennæ creamy except the upper side, flagellum dark reddish beneath.

Length of head and thorax put together: 6.0 mm., first and second abdominal tergites put together: 3.8 mm., fore wing: 9.6 mm., hind wing: 6.8 mm., antenna except scape: 4.4 mm.

Width of head: 5.0 mm., thorax: 5.2 mm., first abdominal tergite at apex: 5.6 mm., second tergite at apex: 5.9 mm.

Relative length of the segments of antenna: I : II : III : IV : V = 15 : 3 : 10 : 5 : 7.

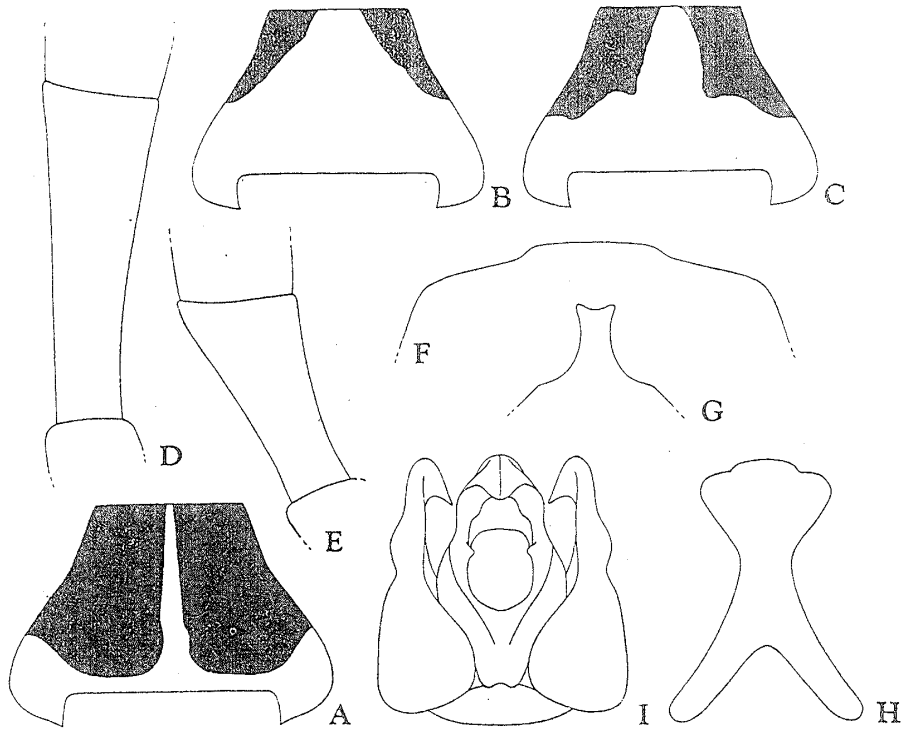

Fig. 3. *Anthophora cingulata senahai* Yasumatsu, subsp. nov.
A. Clypeus of the female (allotype). B. The same of the male (holotype). C. The same of the male (one of the paratypes). D. The third antennal segment of the female. E. The same of the male. F. Apical margin of the sixth ventral plate of abdomen (♂). G. The eighth ventral plate of the same except the base. H. The seventh ventral plate of the same. I. Male genital appendages in dorsal aspect.

♀. Coloured much like the male except for the following differences. Abdomen with four emerald-green bands instead of five. Tibia and basitarsus of mid-legs with a few creamy white hairs, especially pronounced on basitarsi. Clypeus with larger black markings as shown in Figure 3. Third antennal segment black and more slender.

Length of head and thorax put together: 6.5 mm., first and second abdominal tergites put together: 4.2 mm., fore wing: 9.6 mm., hind wing: 7.0 mm., antenna except scape: 3.5 mm.

Width of head: 5.5 mm., thorax: 5.3 mm., first abdominal tergite at apex: 6.0 mm., second tergite at apex: 6.5 mm.

Relative length of the segments of antenna: I : II : III : IV : V = 16 : 4 : 15 : 5 : 5.5.

Holotype—1 ♂, 10. vii. 1933, Ishigaki Island, collected by Mr. Senaha.

Allotype—1 ♀, 20. vii. 1933, Ishigaki Island, collected by Senaha.

Paratypes—1 ♂, 10. vii. 1933, 1 ♂. 20. vii. 1933, Ishigaki Island, collected by Senaha.

1 ♂, 1932, Amami-Oshima Island, collected by Mr. Tamano.

1 ♂, 5. vii. 1934, Sonai-Urabudake-Hinai, Yonakuni Island, collected by Prof. Esaki.

1 ♂, 21. vii. 1934, Sonai-Hoshitate, Iriomote Island, collected by Esaki.

Habitat—Amami-Oshima Island and the Yaeyama Group.

In general appearance, this new subspecies is closely allied to *Anthophora dulcifera* Cockerell, 1926, from Southern China, but the male genital appendages are quite different from those of the latter. According to C. Dover's key (1924), this form may be referable to *Anthophora cingulata* (Fabricius), 1775, of which the typical form is restricted to Australia. However, there are several other subspecies of *cingulata* known to occur in the Indo-Malayan region. Of those, from *A. cingulata andrewsi* Cockerell, 1910, known from India, Java, Borneo, Sumatra, Malay Peninsula, Kei Islands, Celebes and New Guinea, it may be distinctly separable by the coloration of hairs on the hind tibiæ and by the shape of the seventh ventral plate of the abdomen. From *A. cingulata ternatensis* Cockerell, 1910, recorded from Ternate and the Aru Islands, it may be easily distinguished by the coloration of hairs on the hind tibiæ and by the presence of a distinct light marking on the scape of antennæ. On the other hand, the new subspecies is also allied to *Anthophora doveri* Cockerell, 1931, from India (Kumaon), Ceylon and Formosa, but they differ from each other entirely in the shape of the male genital appendages; and, on the contrary, it is near to *Anthophora zonata* (Linné), 1758, in the structure of the stipes of the male genital appendages, although it is distinctly separable from the latter by the coloration of the thorax and by the shape of the sixth ventral plate of the abdomen. According to C. Dover, the male genital appendages of *Anthophora cingulata* (sensu lato) are essentially the same as those in the typical *zonata*, except for the differences in the ventral plates. However, I find some dif-

ferences also in the shape of the stipes between *zonata* and *cingulata senahai*. From the discussions above given, it may be fairly safe to assume that *Anthophora cingulata* may have been evolved into a distinct and stable form *A. cingulata senahai* in the Yaeyama Group and on Amami-Oshima Island.

All the materials, on which the present paper is based, are preserved in the Entomological Laboratory, Department of Agriculture, Kyushu Imperial University, Fukuoka.

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